

DETAILED REMARKS and CLOSING STATEMENTClaim Objections

Improper claims 25 and 38 have been cancelled. Spelling in claim 3 has been corrected.

Claim Rejections

The OA states: "Claims 1-3, 10-11, 16-17, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,982,539 to Shirasaki.", and "Claims 4-6, 8, 9, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki as applied to claims 1-3 and 16-17 above, and further in view of U.S. Patent 4,859,013 to Schmitt et al. ("Schmitt")." and "Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki in view of Schmitt as applied to claim 4 above." and "Claims 12-15 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki.", – rejecting claims 1-20 directed to the teaching of "a router for polarized light".

Applicant amended base claims directed to the router by explicitly including elements which are integral to the invention but are not found in the prior art, namely *seamless integration of the router into a waveguide*. These elements are centered on that the router's integration is on par with the level of integration in microelectronics. Support for this is ample in the specification. On page 3 lines 11 -14 the specification states: "such a technology being *similar and compatible to that used in CMOS technology*, whereby such an optical backplane can be integrated with CMOS technology. It is yet a further object of the invention *to provide for routers in such an optical network*." On page 6 in lines 11-12 it is specifically stated that: "these two parts of the router are seamlessly integrated into an optical waveguide." Indicating the level of integration and the importance of the integration to the present invention is also stated on page 16 lines 10-11: "a router, and a PBS as one element, one can roughly place as many as 100 elements on a 10cm<sup>2</sup> surface." Accordingly, applicant respectfully suggests that the OA statement: "However, the Applicant(s) have not disclosed a perceived criticality to the use of the recited PBS devices of claims 12-15 and 20. Furthermore, such PBS devices appear to have been well known in the art at the time of the claimed invention. Therefore, replacing the PBS of Shirasaki (106-2) with any of the claimed PBS devices would appear to have been an obvious design choice." – is not the case. Embodiment of the PBS as built into the waveguide by CMOS type technologies is central to the invention. Applicant is not aware that "...such PBS devices appear to have been well known in the art ...". On the contrary, in their teaching of the PBS as

discrete element both Shirasaki and Schmitt are teaching away from the present invention. Element 106-2 in Shirasaki cited by the OA, may be part of a network, but it is eminently not part of a waveguide. Same statement is valid for Schmitt, whose teaching is centered almost exclusively on the MOR only. In Fig. 3A of Schmitt the polarizing elements 17 and 18 are clearly discrete elements, not integrated with the waveguide 7 and 6. To summarize, nowhere in either Shirasaki or Schmitt is there a hint for full integration of the PBS into a waveguide together with the MOR.

Applicant amended claim 1 to include into the router the element of an optical waveguide, and amended both claim 1 and 16 to include the seamless integration of the PBS into the waveguide. Applicant respectfully suggests that the amended claims 1 and 16 are not anticipated by Shirasaki, nor would they have been obvious for somebody ordinarily skilled in the art from the combination of Shirasaki and Schmitt.

In view of the amendment to claims 1 and 16, applicant cancels claims 6, 9-11, and 17-20. Having thus overcome the rejection of claim 1, applicant respectfully submits that claims 2-5, 7, 8, and 12 -15, which depend on claim 1, by introducing further limitations are a fortiori patentable. Where needed, these dependent claims have been amended to reflect the changed dependencies, and the explicit inclusion of the waveguide and of the integration of the PBS.

With the exception of claim 36, OA rejected claims 21-40 over U.S. Patent 5,726,788 to Fee et al. ("Fee") in view of Shirasaki, and over Fee view of Shirasaki and Schmitt. Fee indeed discloses an optical backplane, however in view of Fig. 1 of Fee, a backplane of very different nature and scope, and relying mainly on optical fibers, than the backplane of the present invention. For instance, Fig. 4C of Fee having crisscrossing connections is certainly not indicative a type of planar backplane shown on Fig. 7 of the present invention. Thus, it is not clear in which way the exceedingly general statement by Fee cited in the OA: "... basic unit of the optical switch may employ ... any other technology known to people skilled in the art" would be material to the present invention. However, applicant amended base claims 21 and 37 to include, just as do claims 1 and 16, the element of the seamlessly integrated PBS into the waveguide. With this additional element the router of the present invention in no case can fall within the category of Fee's: "any other technology known to people skilled in the art", since in view of Shirasaki and Schmitt the router as part of the amended claims 21 and 37 was not known in the art at the time of the present invention.

Amended base claims 21 and 37 also incorporate the elements of objected claims 25 and 38. Applicant respectfully suggests that the such amended claims 21 and 37 are now

patentable over Fee view of Shirasaki and Schmitt.

In view of the amendment to claims 21 and 37, applicant cancels claims 25, 27, 29, 30, and 38-40. Having thus overcome the rejection of claim 21, applicant respectfully submits that claims 22-24, 26, 28, and 31-35, which depend on claim 21, by introducing further limitations are a fortiori patentable. Where needed, these dependent claims have been amended to reflect the changed dependencies.

New claims 43 -46 have been added to more specifically identify the full scope and breadth of the invention. Logically claims 43-45 should follow original claim 28, and claim 46 should follow currently amended claim 37.

#### Allowable Subject Matter

The OA states "Claim 36 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims." In section 19 of the OA claim 36 is listed amongst claims rejected. However, applicant on 10/09/2003 in a telephone discussion clarified with examiner that the inclusion on claim 36 in the list of rejected claims was inadvertent.

The base claim and the intervening claims for claim 36 were as follows: 21 25 26 35 36. Applicant cancelled claim 36 and added new claim 47 which has all the elements and limitations of claims 21 25 26 35 36, whereby allowed in the same manner as original claim 36. The elements and limitations of new claim 47 are from claim 21: the network of optical waveguides; the routers; the optical devices; from claim 25: the MOR; the PBS; from claim 26: the first section and its details of the MOR; the second section and its details of the MOR; from claim 35: the grating coupling of the MOR; and from claim 36: the plurality of wavelengths individually grating coupled to MOR.

Of the new claims depending on allowed claim 47, claims 48-53 and 57-59 are same as original claims 22-24, 28-30, and 31-33 that were dependent on base claim 21. New claims 54-56 depending on allowed claim 47 have been added to more specifically identify the full scope and breadth of the invention.

A new independent claim 60 and dependent claim 61, for the method of allowed claim 47 have been added to more specifically identify the full scope and breadth of the invention.

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Additional prior art

The OA states: "The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 3,990,776 discloses a magneto-optical waveguide device for optical switching." Applicant respectfully contends that this art made of record does not anticipates or render obvious the amended base claims 1, 16, 21, 37, 47, or 60 of the present invention.

Payment for additional claims

The Commissioner is hereby authorized to charge payment required under 37 CFR 1.16 to Deposit Account No. 50-0510, for 1 excess dependent claim over the original 42, introduced by this amendment.

Closing statement

Applicant respectfully submits that the amended claims include the allowed subject matter and overcome the rejections, as well. Prior art documents and their combinations fail to render the present invention, as expressed in the amended claims, anticipated, or obvious for one of ordinary skill in the art.

On the basis of the above amendments and remarks applicant submits that this application is now in condition for allowance, which action respectfully is requested.

Respectfully,



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